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MEDICAL NEWS LETTER

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Antibodies for Therapy of Cancer

With increasing evidence of linkage of virus-like materials to the etiology of human cancer, clinical treatment by active and passive immunization becomes of interest.

In patients with intact reticuloendothelial and lymphoid systems—early in the course of the disease—active immunization is ideal. Host reactivity can probably be relied upon less and less, however, with degenerative changes in the reticuloendothelial and lymphoid systems. In severely depleted patients, as a result, emphasis must probably shift to passive immunization.

To what extent antigen simplification or development of antigenicity accompanies neoplasia is not known. However, because of inherent difficulties, in exploiting for therapeutic purposes the potentially small differences in the high polymers of the patient's tumor antigens, minimal chemical manipulation of tumor antibodies appears to be desirable. Accordingly, investigation of colloids of insoluble cytotoxic materials coated with a supporting colloid of antibody is being made in an effort to increase the amount and variety of toxic material which can be carried to antigen by each antibody molecule, and to minimize chemical alteration of antibody molecule in the process.

Tumor tissue does not take up colloidal materials. The exact reverse is needed for cancer therapy. By coating cytotoxic colloids with antibody globulin as supporting colloid—or peptizing agent—it is hoped that the cytoxic colloids can be carried preferentially to antigen. Work on uranium colloids raises the possibility of combining the power of atomic fission with the specificity of antigen-antibody reaction for cancer therapy. More importantly, however, use of antibody as supporting colloid to bring uranium and boron selectively to antigen may be a general method for effecting concentration of cytotoxic materials in tumors. If so, many other colloids become potentially valuable.

To explore further the possibility of using antibodies as supporting colloids for a variety of cytotoxic colloids, nonradioactive materials have been used in the authors's study largely because of their availability and ease of handling.

Although, in this study, antibodies used as supporting colloid for a variety of cytotoxins appear to be able to force concentration at antigen of such cytotoxins, it is not intended that such antibody complexes be used alone for treatment of cancer patients. They can be supplemented in several ways.

If, early in the course of the disease, the patient appears capable of forming his own antibodies, these should be used to supplement standard forms of therapy. Autogenous vaccines can be prepared using adjuvants to increase response. Agents which stimulate the reticuloendothelial system may also be useful to supplement the program on active immunization in patients with a reticuloendothelial system capable of responding.

In addition, tumors are chemically vulnerable in two other ways independent of adult metabolic functions which might be lost with increasing anaplasia. As a result, two classes of compounds may be used to supplement the effects of the antibody complexes, the first going preferentially to the central part of tumors, the second going preferentially to the periphery of tumors where tumor is actively invading host.

For any antibody-colloid complex found suitable for use, the basic steps to be followed for clinical application will be the same. Portions or extracts of the patient's tumor cells or the patient's fibrin will be used as antigen. If inadequate quantities of antigen are available, tumor cells will be grown in a cytogenerator or a medullary growth will be harvested by heterotransplantation. Resulting antigen from extraction or breakup of the tumor cells will be injected into horses, sheep, or preferably lactating cows, and antibody collected. The antibodies then will be made to react with suitable cytotoxic colloids and the resulting complex injected parenterally or perfused in the patients along with various supplementary agents previously discussed.

If boron 10 colloids or colloids of the fissionable actinides are of value, the patient will finally be exposed to a beam of thermal neutrons from an atomic pile. If magnetic colloids for inductive heating of tumors are of value, the patient will finally be exposed to a radiofrequency generator. If radioactive colloids as of gold, phosphorus, or iodine, or nonradioactive colloids from cytotoxins, as arsenic or antimetabolites, are used, no further exposure of the patient is needed.

Vasodilators should be used to increase capillary permeability of tumors both during early therapy with autogenous vaccines as well as in the later stages of the disease, when emphasis has shifted to passive immunization and use of complexes of various cytotoxic colloids with supporting colloids of antibodies against tumor. (F. E. Knock, Perfusion of Chemically Modified Antibodies for the Therapy of Cancer: Surg Gynec & Obstet, 111: 322-328, September 1960)

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The Floor as a Reservoir of Hospital Infections

The floor, the largest horizontal surface to accommodate settling bacteria, cannot be ignored epidemiologically. Floor cultures are excellent indicators of the bacteriologic types of infection prevailing; they reflect qualitatively and quantitatively the bacteriology of the room's occupant, and are an index of the infectivity of the environment.

In the authors' study, migration through the air onto the floor of a particular staphylococcus with a specific phage type was traced from three small carbuncles on an otherwise healthy appearing woman. Conversely,

a carrier of a specific phage-type staphylococcus was located by identifying the organism on his living room floor.

Patients with infection continually shed microbes into the environment. These organisms may be carried in droplets, droplet nuclei, or on particles of dust. Droplets settle immediately to the floor; dust particles also drift to the floor, their settling velocity depending upon the size of the particles. Droplet nuclei, the smallest of the three, do not settle to any appreciable extent, although even some of these may eventually be deposited upon the floor. Droplet nuclei are more likely to float about on air currents until inhaled or removed by natural or mechanical ventilation. Particles containing bacteria remain on the floor until stirred up by activity and air currents; the latter may be imperceptible.

Because bacteria accumulate on the floor, the method of floor care employed is the major factor determining the fate of this bacterial debris. Unless these organisms are destroyed at frequent intervals, floor counts reach astronomic proportions and air counts are concurrently increased. The effectiveness of germicides which impart persistent bactericidal activity to surfaces has been considered in this study. All of those used were effective in this regard in the laboratory. However, under extremes of relative humidity and in the presence of infected hospital dust, particularly from textile fibers, removal of the dust and bacteria by cleaning is more effective in decreasing volume counts of airborne bacteria than germicidal treatment of surfaces alone.

The ineffectiveness of conventional methods of floor care has been demonstrated by bacteriologic study. Dry mopping and dry sweeping result in high air counts; moreover, mops and brushes become heavily loaded with bacteria. The conventional mop, pail, and soapy water method does not disinfect and may coat the floor with a thin dispersal of organisms. The wet mop and residual slurry in the pail become a culture medium, yielding in a few hours a bacterial population comparable to a 24-hour broth culture. The mop pail is a great bacterial multiplier and reservoir.

The details of effective floor cleaning have been developed. Use of a germicidal detergent solution, completely spreading a layer of liquid on the floor, followed by removal of the slurry with a wet pickup vacuum cleaner is described. The technique is recommended for daily care of the floor in the operating suite, nurseries, and other areas. It should be used for terminal disinfection of patient care areas. To insure efficient and uniform cleaning, a team of specially trained floor cleaners is desirable. With the flooding technique, the standard for effective cleaning is 800 square feet per man hour. The greatest waste of time results from interference by the professional staff. Because a hygienic environment is a sufficiently important and expensive component of medical care to warrant scheduled periods for cleaning clinical areas, a scheduled routine should be respected by all and interrupted only for emergencies stemming from disease. In industries in

which air hygiene comparable to that desirable in hospitals is essential, experience indicates that the cost of a floor cleaning program is 85 cents per square foot per year. The annual cleaning budget should approximate $170 per bed.

Choice of a germicidal detergent for floor care is critical and should be based on in-use tests. The only valid test of floor disinfection in the individual hospital is culturing after routine cleaning with the product under test. Periodic bacteriologic monitoring of the floor is essential in maintaining high levels of routine performance and in revealing problem areas.

Floor waxes containing germicides were not found to alter floor bacteriology significantly over a period of time. However, they were found preferable to waxes without such agents because of the danger of the wax itself becoming contaminated during storage.

A hygienic environment results in disappearance of hospital strains of bacteria, decrease in cross infection, and shift of the bacteriology of the carrier toward the benign, both qualitatively and quantitatively.

Recommendations

1. Work teams should be trained to clean patient-care areas.
2. Properly designed machines must be supplied to permit effective use of manpower.
3. Informed supervision is essential to enforce proper use of germicide detergent and maintenance of machines.
4. Cleaning time must be scheduled and regarded as an integral part of patient care.
5. Bacteriologic monitoring of floor areas should be instituted to establish in-use effectiveness of cleaning techniques.
6. Floors should be disinfected by the wet pickup technique on the following schedule: (1) daily disinfection of corridor, delivery room, dressing room, emergency ward, isolation room, nursery, pediatric ward, utility room, and operating room; (2) weekly disinfection of medical ward, surgical ward; (3) terminal disinfection of autopsy room, single room, and maternity ward.
7. Vacuum cleaners must be used in place of mops, brushes, and brooms in daily care of floors between periodic disinfection by a wet-pickup procedure.
8. Hospital procedures, such as trash and laundry collection, must be evaluated with the objective of minimizing dispersal of bacteria.

(C. W. Walter, R. B. Kundsin, The Floor as a Reservoir of Hospital Infections: Surg Gynec & Obstet, 111: 412-422, October 1960)

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Chymotrypsin in Surgery

Agents capable of enhancing absorption of edema fluid and blood extravasation and controlling reaction to trauma afford the surgeon an important therapeutic tool. Over a period of several years, many experimenters have reported beneficial effects of injectable aqueous chymotrypsin in such conditions as ocular inflammations, edema and pain associated with thrombophlebitis, reconstructive surgery, ulcers, infected wounds, burns, and many others. The authors report use of this agent in 491 varied surgical procedures.

A stable solution of chymotrypsin was administered intramuscularly in the gluteus maximus or deltoid muscle, 1 ml every 8 hours for 4 days. For uncomplicated fracture reduction and a short stay in the hospital, 1 ml daily was administered. On occasion, a buccal form of chymotrypsin was used to continue therapy after the patient left the hospital—one tablet 4 times a day.

Evaluation of anti-inflammatory results in these 491 cases confirms previous reports that chymotrypsin prevents or reduces objective and subjective signs of inflammation. It dissipates edema by accelerating absorption of hematoma and lymph effusions, particularly in burns, fractures, hemorrhoidectomies, herniotomies, lacerations, and tendon repairs. Particularly gratifying was the comparatively little edema that followed radical mastectomy and neck dissection for malignant tumor. In cases of injury, use of chymotrypsin appeared responsible for an earlier return of lucidity and a shortened convalescence.

Also, it was observed that chymotrypsin-treated patients complained less of pain and required fewer analgesics or sedatives. Understandably, pain reduction is related to lessening of local edema and inflammation.

The number and variety of surgical categories in this series gave ample opportunity to observe any adverse effects on the clotting mechanism. There was no evidence of wound bleeding or oozing except in a single case of tonsillectomy in which it was necessary within 24 hours to replace a ligature. In fact, it has been reported that, to hasten absorption of hemarthrosis, hemophiliac patients have been given parenteral chymotrypsin without any unfavorable hematologic effect. These clinical results are supported by animal studies which failed to produce a single suggestion of chymotrypsin effect on the clotting mechanism.

There have been many clinical suggestions that chymotrypsin has a favorable influence on wound healing; in the author's experience, no instance of delayed wound healing was observed. A favorable effect of wound healing might be expected in view of the fact that reduction or prevention of edema and inflammation improves local circulation. No keloid formation occurred; scars following severe wounds had a better appearance than would have been expected routinely.

The impression that chymotrypsin potentiates action of antibiotics was supported by an extremely low incidence of postoperative infections. It seems logical to employ both an antibiotic and chymotrypsin whenever infection is present or threatens because the antibiotics themselves have no anti-inflammatory capacity.

Severe untoward reactions were not encountered in any patients; in a few instances, the impression was that a moderate elevation of temperature might have followed administratiom of aqueous chymotrypsin. As contrasted to those of the corticosteroids, the anti-inflammatory effects derived from chymotrypsin were not accompanied by fluid retention, electrolyte imbalance, hematologic changes, or hormonal side effects. (L. G. Cigarroa, Chymotrypsin in Surgery: J Int Coll Surg, 34: 442-445, October 1960)

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Idiopathic Migratory Thrombophlebitis

Migratory thrombophlebitis often occurs in thromboangiitis obliterans and in neoplasia, particularly visceral carcinoma; the term "idiopathic" should be applied only to those cases in which no cause is found. The young man who smokes and develops superficial thrombophlebitis extending from one vein to another, neither extensively nor rapidly, should be warned conscientiously of the likelihood of his developing Buerger's disease even before arteries have become involved. Biopsy of an involved vein often shows the characteristic intraluminal granuloma. When multiple, rapidly migrating, and recurrent thrombophlebitis appears in people near or past the age of 50, visceral carcinoma should be searched for thoroughly. Recourse to exploratory laparotomy is mandatory even in the presence of completely negative results from diagnostic procedures.

Sixty or more cases have been reported in recent literature of migrating phlebitis associated with carcinoma. Many were found in patients in whom it had been unsuspected until the significance of migratory or persistent thrombophlebitis—despite adequate anticoagulant therapy or unexplained bleeding with therapeutic prothrombin levels—was recognized. The body or tail of the pancreas continues to be the most frequent primary site of malignancy in these cases (about 45%). The author presents case histories of four such patients.

In relation to therapy of migratory thrombophlebitis, the futility of superficial femoral vein ligations for prevention of embolization—even if the phlebitic process should appear to be confined clinically at below knee level—has not been stressed sufficiently in the literature. It has been demonstrated through anatomic dissections that in 10% the venous pathway from the leg is via the profunda femoris and that, in one series, 37 of the 76 thrombi

dissected in 100 autopsies were above the usual site of superficial femoral vein ligations. In these cases, such a procedure would not have altered the outcome in 21 of 34 patients. Venographic studies have demonstrated direct communications between the profunda femoris and the superficial femoral veins. If operation is contemplated to prevent fatal embolization, the only procedure indicated is inferior vena cava ligation.

Arterial insufficiency of some degree is frequently observed associated with peripheral thrombophlebitis in patients who do not have clinically proved thromboangiitis or arteriosclerosis obliterans, Raynaud's syndrome, or collagen disease. That this finding is of significance in the mechanism of intravascular thrombosis is not known, but it is speculated whether this diminished arterial flow may not provide a factor of stasis or sluggishness and thus cause predisposition to the phlebitis. Once this process is initiated as a trigger factor in the leg, the physicochemical reaction may perhaps extend to other regions of the body. This would explain why, occasionally, the phlebitis occurs elsewhere. Lumbar sympathectomy should be performed if arterial insufficiency is evident in order to promote increased arterial blood flow and remove one of the possible factors responsible for peripheral thromboses. (R. J. Jimenez, Idiopathic Migratory Thrombophlebitis: Surgery, 48: 741-747, October 1960)

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Prophylactic Portacaval Shunts

The formidable incidence of mortality associated with initial hemorrhage from esophageal varices in patients with hepatic cirrhosis has led some surgeons to perform "prophylactic portacaval shunts" on cirrhotic patients who were known to have esophageal varices, but had not experienced a major gastrointestinal hemorrhage. It was hoped that bleeding could be avoided or, at least, that the mortality rate could be reduced. The number of "prophylactic shunt" operations performed at Walter Reed General Hospital is now sufficiently great to warrant review to see if the practice is justified by results obtained.

During the period 1950 through 1959, portosystemic venous shunts were made in 98 patients. All patients had esophageal varices; 29 had not bled, but 69 had experienced one or more gastrointestinal hemorrhages from esophageal varices. The prophylactic shunt operations included 23 portacaval and 6 splenorenal anastomoses. Fifty-eight portacaval shunts and 11 splenorenal shunts were employed in treatment of the 69 posthemorrhage patients. Eight patients without proved cirrhosis were excluded from the analysis because of the more favorable outlook in these cases.

It is not possible to forecast which patient will bleed, and it is difficult to know what percentage of the authors' patients would have bled if

operation had not been performed. There were no deaths from hemorrhage in the prophylactic shunt series, and in only 9. 5% of the posthemorrhage group were the deaths associated with bleeding.

Deleterious effects of surgically produced shunts include operative mortality and hepatosystemic encephalopathy. In the series currently reported, prophylactic shunts carried an operative mortality rate of 3. 5% and posthemorrhage shunt, 11. 5%. Hepatosystemic encephalopathy was less often seen in the prophylactic shunt group (10. 7%) than in the posthemorrhage shunt group (21%); it was often mild, usually episodic, and in only a few instances interfered with work or required dietary and drug therapy. Seven percent of the prophylactic shunt patients and 16% of the posthemorrhage shunt patients bled from varices after operation. Seventy-five percent of the prophylactic shunt group and 46. 8% of the posthemorrgage shunt patients had no nonfatal complications.

More important than incidence of various complications and causes of death is the over-all survival rate: 4 years or more, prophylactic shunt, 64%, and posthemorrhage shunt, 49%; for 6 years or more, 57 and 38% respectively. This is not a highly favorable outcome for any group, but the prophylactic shunt patients would seem to have an advantage over the posthemorrhage group. The superior over-all results obtained in the prophylactic shunt group are assumed to be due in part to better compensation of liver function and general physical stamina of the patients preoperatively, and to the fact that they were not afterwards subjected to the deleterious effects of massive hemorrhage. The authors, therefore, feel justified in continuing to perform portosystemic venous shunting operations on patients with cirrhosis, definite portal hypertension, and esophageal varices before hemorrhage has occurred. (COL B. H. Sullivan Jr MC USA, LTCOL A. Cohen MC USA, LTCOL E. D. Palmer MC USA, Prophylactic Portacaval Shunts: Gastroenterology, 39: 414-419, October 1960)

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Absorption of Blood from Pleural Space

That moderate amounts of blood can be absorbed from the chest cavity in postoperative and traumatic hemothorax is well known. The dynamics of this absorptive process, especially as it pertains to blood, is of considerable surgical interest. However, quantitative information on the subject is difficult to obtain clinically. In addition, few experimental data are available regarding transfer of intrapleural erythrocytes and whole blood across the pleural membrane.

The mechanism and pathway of pleural absorption has been thoroughly worked out. Colloids and particulate matter are absorbed chiefly through the mediastinal and intercostal pleura in animals. There is little or no absorption through the diaphragmatic and visceral pleura. These substances

pass directly through the cells of the pleural membrane—or possibly via "pores" between the cells—to enter the lymphatics. From there, colloids reach the blood stream by way of the right and left lymphatic ducts while foreign particulate matter is filtered out by the macrophages in the lymphatics and nodes. Erythrocytes probably follow the same route as colloids when absorbed from the chest cavity.

The authors conducted experiments on dogs, making interpleural injections of radioactive isotope tagged erythrocytes. Studies were made to determine the rate and extent of absorption of the cells, particularly in the presence of a large hemothorax, and the life span of the absorbed cells.

The experiments showed that erythrocytes were absorbed freely from the normal pleural space in dogs. The marked absorptive capacity of the pleura was demonstrated by complete clearing within 5 to 6 days of a hemothorax consisting of 30% of the animal's blood volume. Blood was absorbed from the chest at about the same rate as that observed from the peritoneum. It has long been recognized that blood is absorbed rapidly after injection into the abdominal cavity.

The proportion of intrapleural red cells which escaped hemolysis during absorption and reached the circulation intact was determined by two different methods. Determining from tagged red cells, only 60 to 70% could be accounted for in the peripheral blood. However, when total absorption was estimated by measuring the change in red cell volume, approximately 100% of the erythrocytes returned from the hemothorax to the blood stream. The disparity of results obtained might be due to increased fragility of the tagged cells, lost radioactivity through elution, or other reasons. Probably, there is little actual loss of normal red cells during their egress from the normal pleural space.

Regarding the practical implications of these experiments, it may be inferred that their results confirm the clinical observation that the human pleura is capable of absorbing considerable quantities of blood in a few days or weeks. Under appropriate circumstances, a hemothorax is in effect returned gradually to the circulation as an autotransfusion.

The suggestion that injection of 25 to 50 ml of blood into the pleural space in a spontaneous pneumothorax will stimulate adhesions between parietal and visceral pleura is not valid. Experience indicates that this small volume of blood is absorbed rapidly with minimal reaction and has no therapeutic value. Five days after a large hemothorax in dogs, there were no adhesions, fibrin, or remarkable gross abnormality in the thoracic cavity except that the pleural surface appeared slightly edematous.

Increased respiratory activity has been shown to enhance the absorption of intrapleural blood. It has also been observed experimentally that a short period of hyperventilation is followed by a prolonged effect on the absorption of fluid from the chest. Thus, it is to be expected that breathing exercises, mobilization of the patient, and other forms of thoracic physiotherapy serve not only to improve pulmonary function but also to augment

the clearing rate of hemothorax. Additional methods for improving the absorption of blood from the chest are being sought and experiments of the type of this report provide a base line for evaluation of new forms of therapy. (J. L. Wilson, et al, The Absorption of Blood from the Pleural Space: Surgery, 48: 766-774, October 1960)

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Clinical Measurement of Gastric Secretion

A decade of experience with tubeless gastric analysis techniques has provided sufficient data to allow a comparative evaluation of intubation and tubeless gastric analysis procedures in clinical medicine. The author describes the rationale, indications, and limitations of a proposed gastric analysis routine developed as a result of this evaluation.

In the past, clinical gastric analysis has concerned itself largely with measurement of hydrochloric acid and, to a lesser extent, with the level of enzyme activity in the gastric contents obtained by aspiration. The degree of acidity has been divided arbitrarily into hyperacidity, normal acidity, hypoacidity, and achlorhydria, depending upon the hydrogen ion concentration (pH) of the aspirated juice.

There are definitive clinical indications to determine gastric hydrochloric acid secretory status as achlorhydria, achylia, and degree of gastric acidity or hydrochloric acid output per unit of time. Detection of relative achlorhydria may be significant in: (1) early detection of carcinoma of the stomach; (2) follow-up of a patient with gastric ulcer niche; (3) diagnosis and therapy of some functional digestive disturbances; (4) ruling out diagnosis of duodenal ulcer in a patient with pseudo-ulcer syndrome; or (5) evaluating completeness of vagotomy. Detection of true achlorhydria is significant in: (1) diagnosis of pernicious anemia; (2) decision for immediate surgery in a patient with gastric ulcer niche; and (3) early detection of gastric carcinoma.

Early detection of gastric carcinoma may be enhanced by screening individuals over 40 or 50 years of age for achlorhydria or achylia for further appropriate investigations. This approach should be of increased significance in subjects with a family history of pernicious anemia or gastric carcinoma. The knowledge that achlorhydria or achylia is present in an individual with symptoms suggestive of carcinoma but without definitive evidence may be decisive for surgical exploration.

Availability of tubeless procedures to measure gastric acidity and gastric pepsinogen secretion makes it appropriate to correlate information so obtained with that provided by intubation techniques in order to learn their relative value in clinical measurement of gastric secretory activity. The types of cells in the glandular tubules of the gastric mucosa consist of mucus- and acid-secreting parietal cells and proteolytic enzyme-secreting

chief cells, all of which vary in number in the various anatomic divisions throughout the stomach. These cells, plus other factors, secrete directly and indirectly the substances that form the complex mixture known as gastric juice. Although the secretory products of these cells pass mainly into the stomach cavity, there is a small but significant passage of enzymes from the chief cells directly into the blood with eventual excretion in the urine.

Tubeless gastric analysis with ion exchange compounds has undergone recent simplification. However, because the test depends on displacement of dye from dye resin compound by the hydrogen ions available in the gastric juice, it is obvious that certain conditions will interfere with the chain of events necessary for proper interpretation. Such conditions include vomiting, pyloric obstruction, malabsorption, severe dysfunction of the liver or kidney, or urinary retention. Tubeless gastric analysis is also not reliable in a patient with a subtotal gastrectomy, gastroenterostomy, or pyloroplasty.

Indirect estimation of gastric pepsinogen secretion by the quantitative measurement of the blood or urinary pepsin activity is much more complicated than the tubeless test for determining gastric acidity. A single determination in any one individual is not of critical diagnostic value, although the mean activity of blood pepsin and uropepsin is high in duodenal ulcer individuals; low, normal, or elevated in individuals with gastric ulcer; low in those with gastric cancer; and extremely low or absent in pernicious anemia patients. However, consistent absence of uropepsin activity in more than one urine collection may be significant in diagnosis of pernicious anemia or gastric cancer, and in suspecting malignancy in a patient with a gastric ulcer niche. For the latter reasons, determination merely of presence or absence of uropepsin activity by any simple test would be of more practical value than quantitative measurement.

Measurement of the acidity of the gastric contents obtained by intubation should have as its primary purpose estimation of the active parietal cell mass. The most logical means to accomplish this would necessitate maximal stimulation and continuous aspiration. The author describes the Kay augmented histamine test which he employs.

As a result of evaluation of the significance and limitations of the tubeless and intubation techniques, the author proposes that the presence or absence of free gastric hydrochloric acid would be determined first by tubeless gastric analysis unless contraindicated by one of the conditions previously described. If achlorhydria is noted by tubeless gastric analysis with either caffeine or histalog as the oral gastric stimulant, further investigation is necessary to establish a true achlorhydria or achylia. Absence of free acid by tubeless gastric analysis with histalog as the gastric stimulant, combined with absence of uropepsin activity as measured by the modified West technique, may be presumptive evidence of true achlorhydria or achylia. On the

other hand, presence of uropepsin activity by this technique may definitely rule out true achlorhydria or achylia.

If proper application of the tubeless gastric analysis technique signifies the presence of free hydrochloric acid, the patient may be spared an unpleasant procedure; intubation gastric analysis will usually be of little significance. Determination of the basal gastric secretory pattern or the hydrochloric acid output after maximal histamine stimulation may be of some value in diagnosis of duodenal ulcer. Although quantitative appraisal of blood or urinary pepsin activity is usually of limited significance, it may provide additive evidence to help in differentiation between a benign and malignant lesion of the stomach. Quantitative measurement of blood pepsin activity has been shown to be valuable in mass screening of individuals who may have a propensity to develop duodenal ulcer. (H. L. Segal, Clinical Measurement of Gastric Secretion - Significance and Limitations; Ann Intern Med, 53: 445-461, September 1960)

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Autoagglutinins in Hepatic Disease

The current lively interest in the etiologic role of autoimmunity in human disease is reflected in a recent review which contains 161 references. It has been suggested that autoantibodies are concerned in the pathogenesis of many diseases. These autoantibodies develop against tissues that have been made autoantigenic by being altered by the action of toxins, chemicals, and intracellular (viral) parasites. Mackay and associates were perhaps the first to postulate, in 1956, that in the case of "lupoid hepatitis," hepatic cell components might become antigenic and that the antibodies called forth in response to this antigen might react damagingly with the liver and thus perpetuate the disease.

In 1957, Gajdusek reported that in the serum of some patients, he had found antibodies that caused complement fixation due to reaction with the watery supernatant material of a homogenate of normal human liver obtained at necropsy. Three of 4 patients with "lupoid hepatitis" and 14 of 25 patients with "other chronic hepatitis" were found to have significant titers in their serum. Other similar demonstrations have been reported, including the finding of circulating complement-fixing (homologous) antibodies in patients with viral hepatitis, "chronic nutritional hepatitis," primary biliary cirrhosis, and secondary obstructing cirrhosis. In one series, serum with a high titer to hepatic antigen usually had a high titer to renal and other tissue antigens. This suggested that the appearance of complement-fixing antibodies in the serum was not of etiologic significance, but rather a secondary response to the pathologic process.

The authors present a study of 9 patients, in 3 of whom they demonstrate serum proteins that could be tagged with fluorescein and that adhered

to the patient's own hepatic intracellular structures. They considered that these autoagglutinins may be autoantibodies. However, the authors interpret their data cautiously for they have not examined the autoagglutinins for certain criteria for immunologic specificity attributed to antibodies. The autoagglutination of the positive cases may be nothing more than a peculiar in vitro phenomenon of their serum proteins; however, each patient who demonstrated this phenomenon had severe, progressive, hepatic disease in contrast to the negative cases. (F. M. Hunter, R. D. Sparks, R. T. Salzman, Autoagglutinins in Hepatic Disease: Gastroenterology, 39: 394-403, October 1960)

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International Congress on Research in Burns

The First International Congress on Research in Burns was held recently at the National Naval Medical Center, Bethesda, Md., and was attended by more than 200 international leaders in the field. The Navy, through the Office of Naval Research, was host for the Congress which was organized by the American Institute of Biological Sciences and financially supported by the Public Health Service, Department of Health, Education, and Welfare. The program was televised in its entirety by the NNMC closed-circuit television system to military hospitals in the Washington area.

The Honorable Frank Berry, Assistant Secretary of Defense (Health and Medical), Honorary Chairman of the Congress, was joined by the Surgeons General of each of the Armed Forces and the Public Health Service, a representative of the American Institute of Biological Sciences, and the Commanding Officer, NNMC, in welcoming the delegates who represented more than 17 countries, including Russia, Japan, Peru, and Yugoslavia.

The present Congress, although the first of international scope, was the fourth such meeting on a national level which resulted from problems encountered during World War II. The last conference was held in 1955 at Brooke Army Medical Center, Fort Sam Houston, Texas where considerable significant development in research in burns has been made.

Dr. Howard T. Karsner, Research Advisor to the Surgeon General of the Navy, was Chairman of the Planning Committee which invited reports from international authorities on important developments in research and clinical treatment of burns during the past 5 years. Dr. Curtis P. Artz, currently Associate Professor of Surgery, University of Mississippi Medical Center, and formerly an Army Medical Officer who contributed much to burn research at Brooke Army Medical Center, was Coordinator for the varied group of contributors to the Congress.

Several reports came from civilian institutions working on this research problem through grants from the Office of Naval Research. A Naval Medical Department facility working in this field has been the Naval Medical Field

Research Laboratory, Camp Lejeune, N. C., where much investigation of the physiopathology of burns and burn shock has been conducted. Use of digoxin and balanced electrolyte solutions in early burn shock has been one of the results of this work.

Among the foreign physicians were: A. B. Wallace, Head of the Burn Service of the Royal Hospital for Sick Children, Edinburgh, and Editor of the British Journal of Plastic Surgery who, in 1948, initiated exposure of burns as a therapeutic procedure; Douglas Jackson, Surgeon-In-Charge of the Burns Unit, Birmingham Accident Hospital, Birmingham, England, regarded as one of the world's outstanding burn surgeons; N. A. Feodorov, Central Institute of Hematology and Blood Transfusion, Moscow, who reported on findings that an immune serum obtained from convalescent burn patients may have beneficial therapeutic effect on burn victims; and M. Dobrkovsky and associates of Prague, Czechoslovakia, who reported finding specific antibodies with a positive reaction to the skin antigen in severely burned patients.

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Early Releases for Reserve Medical Officers Not Approved for Summer of 1961

Each year a number of requests are received from Reserve Medical officers on active duty for release in June in order to begin civilian residency training on 1 July. In most instnces in the past, it has been extremely difficult to approve these requests since reliefs must come from the group of Reserve Medical officers coming on active duty in July and August. With the continuing shortage of Medical officers, most installations could not discharge their responsibilities for adequate patient care if Medical officers were detached before July.

In addition to the foregoing, another problem will exist in the spring of 1961 in the form of an extreme budgetary limitation imposed for this fiscal year. If an officer were to commence travel prior to midnight 30 June 1961, the entire charge for his separation move would be made against the fiscal year 1961 budget. The only exceptions which can be made this year are in the case of Reservists stationed overseas who must commence travel in June in order to complete separation by the specified date in July.

It is regretted that requests for early release cannot be approved for the summer of 1961. A majority of the civilian residency training hospitals which have been contacted by the Bureau of Medicine and Surgery do not absolutely require the presence of the new residents on 1 July. Upon request, this Bureau will be glad to write to a civilian hospital for the purpose of explaining the factors which prevent an individual's arrival on 1 July. (ProfDiv, BuMed)

Course in A B C Warfare Defense

Title: A B C Warfare Defense Course for Medical Officers - Three Weeks' Course - No. 6
Date: Convening 9 - 27 January 1961
Place: U.S. Naval Schools Command, Treasure Island, San Francisco, Calif.
Reporting Time: Prior to 2200, 8 January 1961, Personnel Office, U.S. Naval Schools Command, Bldg. 28
Security Clearance: SECRET

Objectives

The course is designed for experienced active duty Naval Medical officers possessing SECRET security clearance. It will stress the medical aspects of modern warfare and of military peacetime operations, including problems incident to atomic, biological, and chemical weapons systems, nuclear propulsion, mass casualties, and isotope programs. Military aspects of the weapons systems, and military countermeasures will also be considered so that the Medical officers may function effectively on a staff, and can reasonably assess the medical compromises imposed by the military situation. Outstanding speakers, both military and civilian will be on the program. The course will include visits to the Naval Radiological Defense Laboratory and the Naval Biological Laboratory, and will include several practical exercises and drills. Texts will be provided for permanent retention by the students.

Nominating Bureau

Bureau of Medicine and Surgery

Eligibility

1. Medical officers: Requests for attendance are invited from Medical officers of the Regular Navy, excluding residents. Requests from Reserve Medical officers with a minimum of 20 months of obligated service remaining may be submitted for consideration, whose attendance would obviously assist them in the performance of their assigned duties.

2. Dental officers: Officers to attend will be selected by the Bureau.

3. Medical Service Corps: Requests for attendance are invited from Senior Medical Service Corps officers. Preference will be given requests from officers assigned duties on Fleet and/or District Staffs, and Administrative officers of Naval Hospitals.

Interested officers meeting the above eligibility must submit a letter request via their Commanding Officers to reach BuMed (Attn: Code 316) prior to 5 December 1960. Appropriate TAD orders will be requested byBuMed for selected candidates. Travel and per diem expense will be provided from BuMed training funds. Only one course in A B C Warfare Defense scheduled in FY 1961.

Medical Symposiums

The next scheduled Medical Symposiums (MWMS-10) will be conducted at the Field Command, Defense Atomic Support Agency, Sandia Base, Albuquerque, N. M., 27 through 31 March 1961.

TOP SECRET security clearance is required on all candidates approved for attendance. Additionally, Department of Defense participants must be certified to the Atomic Energy Commission for access to Restricted Data by their respective organizations in accordance with appropriate Service regulations.

Officers desiring to attend this course should submit a written request to the Bureau of Medicine and Surgery via their Commanding Officer by 20 January 1961. All requests must indicate that a Security clearance of TOP SECRET has been granted to the officer requesting attendance. Temporary Additional Duty travel and per diem orders from BuMed's training funds will be issued for those authorized to attend.

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American Board of Obstetrics and Gynecology
Written Examination - Part I

Part I Examinations (written) will be held in various cities of the United States, Canada, and military centers outside the Continental United States on Friday, 13 January 1961. Reopened Candidates will be required to submit Case Reports for review 30 days after notification of eligibility. Scheduled Part I Candidates are also required to submit their twenty (20) Case Abstracts in order to complete the Part I examination. Current bulletins outlining present requirements may be obtained by writing to the Executive Secretary, Robert L. Faulkner, M. D., 2105 Adelbert Road, Cleveland 6, Ohio.

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BUMED INSTRUCTION 6120. 16

21 October 1960

Subj: Annual physical examination of certain Marine Corps enlisted personnel in pay grade E-6 or above and/or 30 years of age or over

Although Marine Corps enlisted personnel undergo a complete physical examination periodically and a less extensive examination prior to transfer between units, it is considered desirable that all enlisted Marines in pay-grade E-6 or above and/or 30 years of age or over serving at various stations undergo annual physical examination to maintain physical fitness for combat readiness at all times. This directive promulgates instructions for these examinations.

BUMED NOTICE 1300 21 October 1960

Subj: Combatant duty assignment of Medical Department personnel

Occasionally, information is received in the Bureau which indicates that Medical Department personnel may be assigned to combatant duties, such as coding, notwithstanding the import of NAVREGS art. 1355. This article provides that Medical Department personnel shall not be assigned duties contravening the provisions of international agreements such as the Geneva Convention. Employment of Medical Department personnel in combatant duty even in peacetime would create an undesirable precedent. There are, however, certain duties strictly military in nature, such as service on courts-martial and boards of investigation, that do not affect the noncombatant status of medical personnel. This directive emphasizes that it is important to maintain the status of Medical Department personnel as noncombatant members of the naval service. If members of the Medical Department are not used in Medical Department duties to the maximum extent, assignment to other duty may result.

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From the Note Book

The Surgeon General Visits Antarctica. During recent weeks, at the invitation of RADM D. M. Tyree USN, Commander, Naval Forces, Antarctica, RADM B. W. Hogan, the Surgeon General of the Navy, has been visiting U. S. Navy medical activities in the Antarctic. ADM Hogan left Washington on 23 October 1960, flying to Christchurch, New Zealand. From there he visited the Naval Support Activities, Antarctica and various units of Operation Deep Freeze 61. (TIO, BuMed)

R E E Center Designated. The U. S. Naval Hospital, NNMC, Bethesda, Md., has been designated as the U. S. Navy's Radiation Exposure Evaluation Center. The Laboratory and Receiving Ward, recently completed, was dedicated on 14 October 1960 (News Letter, 4 November 1960).

Heat Stress Studies Continuing. The Surgeon General has announced that heat stress studies are continuing with principal efforts directed toward acclimatization of personnel to hot and cold environments. Facilities for this purpose at the Naval Medical Field Research Laboratory, Camp Lejeune, are being expanded. At the Naval Medical Research Institute, Bethesda, Md., a climatic chamber has been constructed for studies on physiology of acclimatization. A field study in Aden, in collaboration with the British Army, showed that current concepts regarding artificial acclimatization of troops for tropical operations must be revised and better approaches found. (TIO, BuMed)

Neuropsychiatry Consultants Meet. The Surgeon General's Consultants in neuropsychiatry met at the Naval Medical Research Laboratory, New London, Conn., recently, to consider research and operational phases of the neuropsychiatric assessment of personnel for nuclear powered submarines. (TIO, BuMed)

Personnel Changes. RADM Langdon C. Newman has assumed duties as Inspector General (Medical), Bureau of Medicine and Surgery, relieving CAPT Edwin B. Coyl who was placed on the Retired List, 1 November 1960. Relieving ADM Newman as Commanding Officer of the U.S. Naval School of Aviation Medicine, U.S. Naval Aviation Medical Center, Pensacola, Fla., is CAPT Clifford P. Phoebus who had previously been the Director, Astronautical Division of the Bureau.

ADA Meeting. LCDR Elizabeth O'Malley MSC USN, U.S. Naval Hospital, Bethesda, Md., and LTJG Catherine P. Hourihan MSC USN, U.S. Naval Hospital, Philadelphia, represented the Bureau of Medicine and Surgery at the recent annual meeting of the American Dietetic Association held in Cleveland, Ohio. Dietitians at their respective activities, these officers also monitored an educational exhibit at the meeting. (MSC Div, BuMed)

Villanova Student Nurses at Philadelphia Hospital. Twenty-six student nurses from Villanova University have commenced a 12-week period of on-the-job training at the U.S. Naval Hospital, Philadelphia. Individual groups of students are working in the Obstetrics and Pediatrics branch of the hospital's Dependents' Clinic, and in the Neuropsychiatric Service. Each of the groups are supervised at the hospital by their respective instructors from Villanova. This is the first time that the Philadlephia Hospital has been chosen by the school for this phase of the students' training.

Metaraminol as a Vasopressor Agent in Spinal Anesthesia. From clinical comparisons of 850 patients, the authors report that metaraminol was found to be a potent vasopressor drug, more effective in lowering the incidence and decreasing the extent of the hypotension of spinal anesthesia than ephedrine. It has a prevailing central cardiac action, and is longer acting than ephedrine. Continuous intravenous drip was shown to be the most efficient and controllable method of administration. (O. Munchow, et al, Anesthesiology, September - October 1960)

Thalassemia. Clinical and laboratory data on 6 patients with heterozygous thalassemia reemphasizes that a "Mediterranean background" is not essential for diagnosis. Racial backgrounds included Danish, English, Filipino, and Negro. Newer diagnostic criteria are discussed; wider use of these methods may increase recognized incidence of the disease. (CDR W. McFarland MC USN, LT H. Pearson MC USN, Ann Int Med, September 1960)

Early Detection of Drug Induced Erythropoietic Depression. An increase in plasma iron content and saturation of iron binding globulin precedes the fall in hematocrit by an appreciable interval in erythropoietic depression induced by chloramphenicol and related drugs. A rise in plasma iron content and increase in saturation of the iron binding globulin can serve as a reliable and sensitive index of early erythropoietic toxicity. It is suggested that routine serial determinations of plasma iron content be performed in conjunction with administration of drugs with potential hematologic toxicity in an attempt to avoid serious injury to the marrow. (D. Rubin et al, J Lab Clin Med, September 1960)

Pulmonary Cryptococcosis. Discovery of 3 cases of pulmonary cryptococcosis, occurring during a period of 3 years in a 300-bed naval hospital, supports the contention of the literature that this entity is not rare, and should be considered in differential diagnosis of "coin lesions", unresolved or slowly resolving pneumonia, and pulmonary infiltration of uncertain etiology. Gradually improving clinical and x-ray picture in the 2 cases receiving amphotericin B adds to the growing bulk of evidence that this agent is effective against C. neoformans. In their experience, side reactions were controllable; periodic IV infusions of 1% procaine were particularly successful in preventing thrombophlebitis in one case. (LT J. Durant MC USNR, et al, Ann Intern Med, September 1960)

Circulating Pancreatic Antibodies. The majority of sera from patients with chronic pancreatic disease or carcinoma of the pancreas contain circulating antibodies specific to human pancreas. However, control sera from other disease states—in particular from diabetes mellitus—showed some positive reactions. Experimental work in progress suggests that auto-immunization of animals with their own pancreas may lead to chronic pancreatitis after a prolonged period of time. (M. Jurray, A. Thal, Ann Intern Med, September 1960)

Cholesterol-Synthesis Inhibitor. Triparanol, demonstrated in animals to be an inhibitor of cholesterol synthesis, was evaluated in groups of patients for its effect on the level of serum cholesterol. Results indicate that the medication in many cases lowers the level of serum cholesterol; effect is not maintained when medication is discontinued; continued administration fails to maintain the initial depression in level of serum cholesterol. (M. Carver, et al, Ann Intern Med, September 1960)

Effectiveness of Cyclophosphamide. Thirty-five patients with various types of malignancies were treated by various regimens of cyclophosphamide (Cytoxin). The authors concluded that the drug demonstrated about the same degree of toxicity and antitumor effect noted with the commonly used alkylating agents. Its ease and versatility of administration may represent an advantage in tumor chemotherapy. (L. Foye Jr, et al, Arch Intern Med, September 1960)

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DENTAL SECTION

Glucose-Tolerance Test Employing Parotid Secretion

In an attempt to better understand carbohydrate metabolism of the parotid gland concomitant with the increased importance of oral manifestations of diabetes mellitus, a glucose-tolerance curve was established on the pure secretion from that gland. Ten healthy postabsorptive individuals whose baseline was well established were given single doses of glucose to the extent of 1 gm/Kg body weight. Measurements were made at varying intervals up to 3 hours after ingestion. Stimulation was effected by chewing flavored chicle gum, and collections were made with conventional parotid cups. Care was taken to prevent chemical or bacteriologic contamination.

A modified anthrone technique of sufficient sensitivity to detect minor changes was employed. The period of rise and persistence of glucose was similar to that found in blood, although the initial rise was more rapid and the duration slightly longer. The amount of glucose present was generally much less than that found in blood, although its initial appearance was immediate after dosage. It was necessary to make collections for 15 minutes in order to obtain replicate values.

Other sugars and commonly employed commercial sugar substitutes were also tested with favorable results. This technique eliminates the distressing cumbersome sampling means now employed to measure glucose tolerance by voluminous urine samples or repeated venipunctures. It also affords the dentist an opportunity to work solely in the oral cavity—a region with which he is familiar and for which he is equipped. (CAPT R. B. Wolcott DC USN, T. B. Weber, A Glucose-Tolerance Test Employing Parotid Secretion: J Dent Res, 39: 718, July - August 1960)

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New Extension Courses

Two new extension courses, Operative Dentistry (NavPers 10759) and Dental Department Administration (NavPers 10736-A) are now available to Dental officers of the U. S. Navy and Naval Reserve. These courses were developed by the staff of the U. S. Naval Dental School with the assistance of professional test writers of the Home Study Department of the University of Chicago.

The course in Operative Dentistry, comprised of six assignments, is designed to review and reemphasize the basic and uncontroversial principles of operative dentistry upon which successful practice is based. This is primarily a refresher course which presumes competence in oral diagnosis and treatment planning. Mechanical principles are stressed throughout with biologic principles being considered within the context of mechanical operations to the extent that they serve to qualify or explain operative procedures. The course material includes a new edition of a widely accepted clinical operative dentistry textbook.

The course in Dental Department Administration is the 1960 edition of the previous course, Dental Department Administration (NavPers 10736). This is a twelve assignment course and is designed to inform the Dental officer of his duties and of the policies and practices of the Dental Department of the Navy and the Bureau of Medicine and Surgery as related to the efficient organization, management, and administration of a dental department. The course should be particularly valuable to newly commissioned Dental officers, to Dental officers in the Naval Reserve who do not have the opportunity to keep abreast of the latest naval procedures and developments outside the technical and professional field of dentistry, and to newly appointed heads of dental departments.

The course in Operative Dentistry is the sixth in a series of postgraduate level extension courses prepared by the Naval Dental School to augment the Continuing Education Program of the Navy Dental Corps. Courses previously announced are: Endodontics (NavPers 10407), Oral Diagnosis (NavPers 10739), Oral Surgery (NavPers 10729), Prosthodontics (Part I), Complete Denture Prosthesis (NavPers 10763), and Prosthodontics (Part II), Partial Denture Prosthesis (NavPers 10764). Other courses covering crown and bridge prosthesis and periodontics are planned.

These courses are intended to provide Navy Dental officers—especially those at sea or at remote stations—with a balanced educational program. They are not intended to replace short postgraduate courses, graduate courses, residency training, or the many other excellent educational experiences now enjoyed by officers of the Dental Corps.

Naval Reserve Promotion and Retirement Credit. Reserve Dental officers receive promotion and retirement points upon successful completion of each course or course unit as indicated:

Operative Dentistry is evaluated at 12 Naval Reserve retirement and/or promotion points upon successful completion of the entire course of six assignments.

Dental Department Administration is evaluated at 24 Naval Reserve retirement and/or promotion points. Naval Reserve personnel who have previously completed the course, NavPers 10736, will receive additional credit for completing the revised course, NavPers 10736-A. Points will be credited by units: Unit 1 - 12 points upon completion of assignments 1 through 6;

Unit 2 - 12 points upon completion of assignments 7 through 12. Applications for enrollment should be submitted on NavPers 992, Application for Enrollment in Officer Correspondence Course, via official channels to the Commanding Officer (Code 5), U.S. Naval Dental School, National Naval Medical Center, Bethesda 14, Md.

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Short Course - Oral Pathology

A short postgraduate course in Oral Pathology will be presented at the U.S. Naval Dental School, NNMC, Bethesda, Md., 5 - 9 December 1960, as a part of the Navy Dental Corps' Continuous Training Program.

This course is designed to increase the knowledge of the Dental officer in the fields of oral pathology and oral diagnosis. Disturbances in development, diseases of the oral mucosa and jaws, oral manifestations of certain systemic diseases, and benign and malignant oral neoplasms are discussed in detail. Their clinical and microscopic characteristics are illustrated with slides. Lectures are correlated with case presentations, microscopic seminars, and round table discussions.

Instructors for the course, both Diplomates of the American Board of Pathology, will be CAPT L.S. Hansen, Chief, Dental and Oral Pathology Division, Armed Forces Institute of Pathology, and CDR H.H. Scofield, Head, Oral Pathology Division, U.S. Naval Dental School.

Quotas have been assigned to the 1st, 3rd, 4th, 5th, 6th, and 9th Naval Districts, the Naval Air Training Command, and the Potomac River and Severn River Naval Commands.

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Price Change in Newly Standardized Dental Items. The listed information informs all dental activities of price changes in newly standardized items:

Stock Number	Item Identification	Unit of Issue	New Approximate Unit Price
6520-687-8406	PAPER, ARTICULATING, DENTAL, BLUE, 4 by 3/4 inches, 144s: 0.004 inch thick	Pkg.	$0.77
6520-687-8407	PAPER, ARTICULATING, DENTAL, BLUE, 4 by 3/4 inches, 72s: 0.014 inch thick	Pkg.	$0.66

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Personnel and Professional Notes

Representation at ADA Meeting. RADM C. W. Schantz, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry), and Chief, Dental Division, represented the Surgeon General and served as the Navy's delegate in the House of Delegates at the 101st Annual Meeting of the American Dental Association in Los Angeles, Calif., 17 - 20 October 1960. The Navy's alternate delegate was CAPT A. R. Frechette, Deputy Chief of the Dental Division; RADM Ralph W. Taylor DC USN attended the meeting in connection with his duties as Director, Naval District Activities, Pacific Coast.

In addition to those previously listed, the following Navy Dental Corps officers participated in the scientific presentations of the session: CAPT K. M. Broesamle, Senior Dental Officer, U. S. Naval Training Center, San Diego, presented a paper, Improved Color Dental Photography; CAPT E. R. Hildreth Jr. and CDR C. A. DeLaurentis, U. S. Naval Amphibious Base, Coronado, Calif., with LT R. G. Spamer (USNR), U. S. Naval Station, San Diego—all members of the J. C. Metcalf Gold Foil Seminar of San Diego—appeared as clinicians before the American Academy of Gold Foil Operators; CAPT R. B. Wolcott, Director, Dental Research Facility Division, Dental Department, Naval Administrative Command, U. S. Naval Training Center, Great Lakes, Ill., served as Program Chairman and President-Elect of the American Academy of Gold Foil Operators in addition to serving as Panel Moderator and leading the discussion on Restorative Dentistry.

CAPT Stanmeyer Nominated to Dental Research Council. CAPT W. R. Stanmeyer DC USN, Bureau of Medicine and Surgery, was nominated recently as Navy Liaison Officer on the National Advisory Dental Research Council. In addition to his assignment as Head of the Professional Branch, Dental Division of the Bureau, CAPT Stanmeyer has relieved CAPT J. A. English DC USN (Ret) as Head, Medicine and Dentistry Branch, Office of Naval Research.

CDR Rovelstad Nominated to Dental Study Section. CDR G. H. Rovelstad DC USN has been nominated to serve in the Dental Study Section of the National Institutes of Health. CDR Rovelstad is on duty at the U. S. Naval Dental School, NNMC, Bethesda, Md., as Assistant, Research and Sciences Division, Clinical Services Department; and Assistant, Research and Biostatistics Division, Officers Education and Training Department.

Navy DO's at Manila Dental Society Meeting. CAPT F. K. Etter, Force Dental Officer, Commander Naval Forces, Philippine Islands, and LCDR R. H. Flagg, U. S. Naval Station, Sangley Point, presented table clinics—A Dental Comparison of Filipino to American Recruits, and Post Crown Restorations in Endodontically Treated Anterior Teeth, respectively—at the Scientific Seminar of the Manila Dental Society, 27 October 1960.

RESERVE SECTION

Retirement Regulations Outlined for Reservists

(This is the second of three articles on Reserve Retirement Regulations)

Prorating Points. The 50-point requirement for one year's satisfactory Federal service may be prorated for a partial year and the 15 gratuitous points are similarly prorated. To prorate, however, the status of the member must change at the end of the period to be prorated. Change of status means resignation, discharge, or transfer to the Inactive Status List or Retired Reserve.

As an example, assume a Reservist has 19 years and 8 months of "satisfactory Federal service" on 30 June 1959. In order to complete 20 years, he needs 4 months' additional service. To credit these 4 months, he must have 17 retirement points (4/12 times 50). He is given 5 gratuitous points (4/12 times 15), so he must earn 12 points from 1 July to 1 November and request transfer to the ISL or Retired Reserve, or otherwise be severed, effective 1 November. For each additional month beyond 1 November, he must earn 1/12 times 50 points in order for the service of any part to be creditable. Change of status cannot be effected retroactively.

Check Your Retirement Credits. If you are a Reserve officer, you may obtain a statement of your satisfactory Federal service (no oftener than once a year) by addressing a request directly to: Officer in Charge, U. S. Naval Reserve Officers Recording Activity (RORA), 30th and Fort Streets, Omaha 11 Nebraska.

If you are an enlisted Reservist, you may obtain information regarding your satisfactory Federal service from the commanding officer of the unit to which you are attached, from the commandant of the naval district holding your service records, or from the Chief of Naval Personnel (PersE3).

Computing Retirement Pay. The rate of retirement pay is the number of accrued retirement points divided by 360 and multiplied by two and one-half percent times the applicable base pay of the rank or rate in which retired. Maximum pay is 75% of basic pay.

Points for retirement pay purposes are credited as follows:

1. Through 30 June 1949, 50 points are given for each 365 days of inactive duty.
2. After 30 June 1949, points earned as indicated in the paragraphs above are credited to a maximum of 60 points each year.

3. One point is credited for each day of active duty and active duty for training, including travel time.

The official method by which retirement pay is computed is: Add the total of the three preceding paragraphs, divide by 360, then multiply by two and one-half percent and by the applicable monthly basic pay of the rank or rate in which retired in order to compute your monthly retirement pay.

Pay will be based upon the highest permanent or temporary rank or rate in which service was satisfactory, as determined by the Secretary of the Navy.

Retirement pay begins on the effective date of retirement. This may be the first of the month after the date of reaching age 60, or the first day of the month after completion of the service requirements, whichever is later.

Income from Other Sources. Naval Reservists in receipt of retirement pay under this law are exempt from the dual employment statute (5 U. S. C. 58 and 62) and the dual compensation statute (5 U. S. C. 59a).

Social Security and Civil Service retirement pay benefits may be received concurrently with Naval Reserve retirement pay.

Neither pension nor disability compensation benefits from the Veterans Administration, nor compensation under the provisions of the Federal Employees' Compensation Act, as amended, may be recieved concurrently with retired pay. However, a member or former member may waive his retirement pay in order to receive VA compensation or pension in lieu of retirement pay, and may later elect to receive retirement pay in lieu of VA compensation or pension.

What Happens if You Complete 20 Years Before Age 60? There are four possible alternatives which may be followed if 20 years of satisfactory Federal service are completed before the Reservist reaches age 60:

1. Continue active membership - In this way, the Reservist may increase the amount of retirement pay by earning additional points as well as by adding years of service which increases the basic pay upon which retirement pay is based.

2. Request transfer to the Inactive Status List - In this status, the Reservist may not earn additional retirement points. However, ISL time does count for periodic basic pay increases. Basic pay is increased by additional years of service up to 22 for Commanders and 26 for Captains.

3. Request Transfer to the Retired Reserve - Except while serving on active duty, no additional points nor years of satisfactory service may be accrued in this status. However, the individual would remain a member of the Naval Reserve in an "honorary" capacity and thus be eligible for certain other benefits, including longevity credit for basic pay purposes.

4. Resign or be Discharged - In this instance, civilian status would be completely resumed. The individual would be eligible only for retirement pay (provided he has satisfied the basic requirements) in the nature of a pension when age 60 is reached, and he would not be placed upon the Retired

List. He would not be eligible for any other benefits; similarly, he would not be subject to recall to active duty.

Privileges of Reservists Retired with Pay. Many service-connected privileges are accorded Reservists retired with pay. When not on active duty, they are entitled to wear the prescribed uniform of the rank or rate held on the Retired List when wearing of the uniform is appropriate. They are allowed to use their military titles in connection with commercial enterprises. They may be accorded the privileges of Navy Exchanges, small stores, officers' clubs, enlisted clubs, Armed Services exchanges and commissary stores—subject to the availability of facilities.

Members and former members who have served a minimum of 8 years of active duty (not including AcDuTra) and their dependents are entitled to medical care. Information on medical care for retired Reservists and their dependents is contained in the Manual of the Medical Department, Chapter 21, and in BuPers Instruction 1750. 5A.

Retired personnel and their accompanying dependents may take one round trip per year (on a space-available basis) on an MSTS vessel, subject to payment of the applicable MSTS charges for space-available travel. Retired Reservists and their accompanying dependents also may travel via MATS on a standby, space-available basis.

Obligations of Retired Reservists. In addition to their many rights and privileges, retired Reservists also have certain obligations. They are, of course, subject to the regulations of the Secretary of the Navy. They may be ordered to active duty in time of war or national emergency at the discretion of the Secretary, but may be ordered to active duty in peacetime only with their consent.

They are prohibited from wearing the uniform in connection with nonmilitary, personal, or civilian enterprises, or activities of a business nature. Retired personnel in an inactive duty status in a foreign country may not wear the uniform except when attending, by formal invitation, ceremonies or social functions at which the wearing of the uniform is required by the terms of the invitation or by the regulations or customs of the country involved.

All retired personnel are required to report changes of address to the commandant of the naval district in which they reside. They must keep the Commanding Officer, U. S. Navy Finance Center (Special Payments Division), Cleveland 14, Ohio, informed of any change in mailing address. (The Naval Reservist, November 1959)

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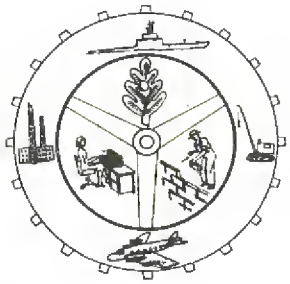
The Naval Reserve Medical Department Program (NavMed P-5068) disseminates information concerning Reserve medical units and provides a source of material to MD personnel. The revision of this publication includes information of value to all who are interested in Reserve medical activies. Requests for the publication should be addressed to the Naval District Commandant.



OCCUPATIONAL MEDICINE

Hazards of Microwave Radiations - A Review

Since World War II, radar and other microwave equipment have come into use by the Armed Forces, commercial aviation, navigation, and to a lesser extent, by medical science. While it is generally believed that microwaves in these applications are harmless, sporadic reports of injuries attributed to microwaves are in the literature.

The term microwaves is used to designate a certain portion of the electromagnetic spectrum; it generally includes frequencies between 1000 and 30,000 megacylces per second, or in terms of wave length, between 30 cm and one cm.

Two radar bands are now in common use: the "S" band, with a frequency of 2880 megacycles and a wave length of 10.4 cm, and the "X" band, with a frequency of 9375 megacycles and a wave length of 3.2 cm.

Microwaves are used in clinical medicine as a means for heating tissues beneath the skin and subcutaneous fatty layers. The diathermy application depends on the fact that heat is produced wherever microwave or any other energy is absorbed.

Microwave diathermy machines typically have a frequency of 2450 megacycles, a wave length of 12.2 cm, and a power output of 125 watts.

Absorption of Microwave Energy in Tissue. Any biologic effect, beneficial or harmful, produced by microwaves can result only from absorption of energy by the tissues. The amount of energy absorbed by a small volume of tissue in a large mass of tissue subjected to microwave radiation depends on a number of factors:

1. Intensity or field strength of the microwave radiation incident on the surface of the tissue mass
2. Duration of the exposure
3. Frequency or wave length of the microwave radiation
4. Thickness of tissue between the irradiated surface and the small volume of tissue
5. Composition of the tissue

The degree of temperature rise produced in the small volume of tissue will depend on the five factors above and on the ability of the irradiated portion

of tissue to rid itself of excess heat. It should be noted particularly that the energy deposition in tissue is dependent on microwave frequency and on composition of the tissue.

Biologic Effects of Microwaves. On purely physical grounds, it can be said that absorption of energy from microwaves or from any other penetrating radiation will raise the temperature of the absorbing material. If the absorbing material is the tissue of a living mammalian organism, the temperature elevation will set in motion a complex sequence of homeostatic mechanisms that tend to restore the normal temperature. Under steady state irradiation conditions, an equilibrium will be attained at a temperature somewhat higher than normal. The human body is capable of dissipating heat at a rate on the order of 0.01 to 0.1 watts per square centimeter of body surface. Thus, the average human body is able to absorb between 100 and 1000 watts of energy from an outside source like microwaves while still maintaining an equilibrium, but an elevated temperature. Higher rates of energy absorption will overpower the regulatory capabilities of the body and lead to a continuous temperature rise and, ultimately, death.

All tissues of the body are not equally equipped for heat dissipation and temperature regulation. The lens of the eye and hollow viscera, such as gallbladder, urinary bladder, and parts of the gastrointestinal tract, for example, are comparatively avascular and largely devoid of effective temperature regulating mechanisms. It is reasonable to expect that such organs will suffer relatively larger temperature rises and will be more liable to injury by microwave irradiation than other body organs. Experiments have, in fact, shown that severe and injurious temperature increases occur in these organs under microwave irradiations accompanied by only slight increases in rectal and oral temperature.

It is not clear whether all biologic effects of microwaves can be attributed solely to temperature increases that result from energy absorption, or whether these effects are produced in part by mechanisms other than simple thermal elevation. Hines and Randall were unable to find any crucial experimental evidence for biologic effects unrelated to temperature change. It should be pointed out, however, that at this time it is impossible to rule out completely the possibility of athermal effects of microwaves.

Experimental Evidence in Laboratory Animals. Hines and Randall in 1952, reported the pronounced effects of high intensity 10 cm microwaves on laboratory animals. Rabbits exposed to a constant 3000 watt field for 75 seconds were killed instantly, and a 30 second exposure produced death within 2 minutes after irradiation was terminated. At this same power level, a rat was killed by a 22 second exposure. A hamster exposed to a 400 watt field died immediately after a 10 second exposure. These lethal effects are attributed to a generalized increase in body temperature which ultimately

leads to a thermal paralysis of the respiratory center. Irreversible cellular injury and death may occur when tissue temperature is maintained 5 C above the normal body temperature. Irreversibility of the injury depends on duration of the hyperthermic episode; the higher the temperature the shorter the time necessary to cause cell death.

It was observed that when only a limited area of the body, such as the abdomen, was irradiated, the temperature of the visceral organs was markedly elevated despite normal oral and rectal temperature. Studies with relatively low power levels showed that the rise in brain temperature is not the primary cause of death when the abdomen alone is irradiated, but the elevation of brain temperature is probably the primary cause of death when only the head is irradiated. Oldendorf, employing 12.5 cm microwaves, demonstrated that irradiation of the head of rabbits destroys brain tissue without apparent injury to the skin.

The cause of death from abdominal irradiation is usually attributed to shock; in other words, the mechanism of death is not understood. It is postulated that tissues respond to heat denaturation with an aseptic inflammatory reaction and are, as a consequence, prone to infection. This in turn may lead to peritonitis and shock. Boysen studied whole body radiation in experimental animals, using a 350 megacycles microwave generator with a power output of 5 to 500 watts. He observed hyperemia, hemorrhage, and necrosis in the bowels of irradiated animals and found the jejunum and ileum particularly susceptible to microwave radiation. Hyperemia of the spleen and hemorrhage into the myocardium were also observed. In addition, bloodless diarrhea ensued in each instance.

Although the precise temperature at which injurious effects are first noted has not been determined for all tissues, it is known that it varied for different tissues. It is well known that the testes undergo degenerative changes when maintained for a considerable period of time at a temperature equal to that found in the abdominal cavity. Severe testicular damage has been produced in animals by microwave irradiation. Studies of the effects of 12 cm microwaves upon the testes of adult rats have shown that a single 10 minute exposure caused testicular degeneration at a temperature of only 35 C measured in the central area of the gland. No evidence of any damage to the epidermis was found despite the pathologic changes which occurred in the interior of the gonads.

Cataract production is a frequently reported microwave injury. Microwaves of about 10 cm tend to produce maximum heating in tissue about one cm below the irradiated surface. Studies by Richardson, et al, showed that rabbit eyes exposed for 15 minutes at a distance of 5 cm from a 100 watt source of 12 cm microwaves developed lesions of the eye resembling cataracts in 3 to 9 days after the exposure. A series of repeated exposures to a lower power level at the same frequency produced cataracts in from 2 to 42 days. These cataracts varied from small posterior polar masses to almost complete

involvement of the lens. The thermal coagulation of the protein in the cells of the lens is believed to be responsible for formation of these lesions.

In studies carried out on rabbits irradiated with 12 cm microwaves, it was found that greater temperature increases occurred in tissue containing metal implants than in control tissues.

It is believed that the microwave radiation is reflected by the metal plate and that standing waves are set up in the tissues between the metal plate and the irradiated surface. The energies of the reflected wave are added to that of the original radiation so that a greater temperature increase occurs. The effect of a metal implant depends on the depth of the implant and the wave length of the microwaves. This may have significance to people with metal bone implants, metal plate covering a cranial defect, or retained wire sutures in the body. Such people may be quite vulnerable to tissue damage from exposure to microwave.

Injuries in Man. Studies by Daily and by Lipman and Cohn have shown no harmful effects of microwave irradiation to man. On the other hand, there are occasional reports of such injuries in the literature.

A case of bilateral cataracts in a 20-year old radar repairman was reported in 1952. A few months later, Hirsch and Parker reported similar lesions in a 32-year old technician who had operated a 100 watt microwave generator in the range of 9 to 18 cm for 11 months. This man was in the habit of placing his hands and head in the microwave antenna to determine whether the generator was operating. The lenticular opacities in this case resemble the nuclear type produced by microwaves in experimental animals. There was, in addition to the lenticular opacities, a choroiditis of the left eye that may have resulted from the microwave exposure.

McLaughlin, in 1957, reported a fatal case of accidental exposure to microwaves in a 42-year old white male. The validity of ascribing this fatality to microwaves has been vigorously protested. It has been denied that any exposure occurred, and further, that the cause of death was an ordinary ruptured appendix accompanied by generalized peritonitis. At this time, the McLaughlin findings are neither accepted nor rejected; the case is cited here chiefly to note that this is a matter of active controversy.

Although no permanent injury has been reported from microwave exposure of people with metal implants in their bodies, reversible physiologic changes have been described by Rieke. He reported a case of post-injury swelling in the hand of a 58-year old carpenter who had a stainless steel plate implanted in the proximal phalax of the left index finger for a compound fracture and whose hand and finger were supported by an aluminum splint. Following an uneventful postoperative course, the patient returned to work some 22 days after the injury and noted the onset of swelling and pain in the left hand which persisted and was unexplained in the next two weeks. He worked near a high frequency glue drying machine and it was later realized that he

had been receiving unplanned diathermy owing to exposure to this radiation at work. The swelling and pain disappeared when he stayed away from the machine. In this case, the swelling and pain may be explained on the basis of heat induced in the steel plate and aluminum splint by absorption of the radiation energy. This phenomenon has been confirmed by the animal experiments described earlier.

Prevention of Injury. Increasing use and power of microwave equipment in the Armed Forces, in navigation, communications, and in medicine, and the possibility that microwave radiation may produce biologic injury indicate the wisdom of preventing inadvertent exposure to these radiations. People most liable to accidental exposure are those who operate or service high power radar equipment. The most obvious form of protection is to prevent people from entering radar beams. The radar beams should be pointed toward unoccupied areas when possible; metal screens may be used to shield out the radiation; lights may be installed to warn personnel that the radar set is on and to indicate the boundaries of the beam; people who work in the vicinity of radar equipment can be supplied with photographic flash bulbs to warn them when they are exposed to intense microwave fields. Perhaps people with metal implants in their bodies should be excluded from work with such equipment.

The potential hazards of microwave diathermy are considered by many to be much less than the hazards associated with radar equipment. The justification for this view is that the power output of the diathermy machines is so much smaller than that of radar equipment. This specious argument disregards the fact that it is not the power output of the device that determines its hazard, but rather the amount of energy that it deposits in tissue. The physical and biologic situation in tissue irradiated by microwaves to the extent that a temperature rise of 3 C is produced is the same whether the radiation is delivered by a diathermy machine or a radar transmitter. A backward glance to the once fashionable use of radium salts and x-rays may not be out of place.

In cases where microwave diathermy is considered to be the treatment of choice, such vulnerable organs as the testes and eyes can be protected by close-fitting metallic screens. Extreme care should be exercised in application of microwave diathermy to patients with metallic implants to prevent excessive heating and tissue damage.

Treatment. There is no suitable treatment once irreversible damage has occurred. Shock resulting from prolonged local body irradiation should be treated by maintenance of blood pressure with a vasopressor, infusion of blood or fluid, and supportive therapy. Should respiratory embarrassment be found as the result of whole body irradiation, artificial respiration and oxygen should be administered and a means for rapid cooling of the body provided. As yet there is insufficient clinical experience to prognosticate the

course of this type of illness; therefore, any prognosis should be guarded in these patients until more is known about microwave radiation. (Kuo-Chiew Quan, Hazards of Microwave Radiations: Industr Med Surg, 29: 315-318, July 1960)

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Occupational Disease in California Attributed to Pesticides

Geographic Distribution. Reports of occupational illness attributed to pesticides and other agricultural chemicals came from 49 of California's 58 counties, nearly half from the following jurisdictions: Fresno, Los Angeles, and Tulare 10% each; Santa Clara 8%; and Kern 7%. Fresno, Los Angeles and Tulare are the three leading employers of agricultural labor with Fresno employing by far the largest number of workers. Kern and Santa Clara are in sixth and ninth place, respectively, as employers of agricultural labor.

The agricultural industry was responsible for most of the reports from counties having the greatest number of reports with the exception of Los Angeles. Only 21 of Los Angeles' 93 reports came from agriculture. Nearly two-thirds came from other industrial categories: manufacture 20 reports, government 18 reports, trade 13 reports, and service 10 reports.

Chemicals. The need to control the damage to crops by pests and diseases requires continuous research and manufacture of new materials. Every year the number of pesticides and other agricultural chemicals put on the market increases. All pesticides sold in California must be registered and the label must show the chemical or common name of the active ingredient as well as appropriate warnings and precautions.

The organic phosphate chemicals, with a few notable exceptions such as malathion, are among the most hazardous materials used as pesticides. Parathion, TEPP (tetraethyl pyrophosphate), Systox, and Phosdrin are highly toxic phosphate ester (more commonly called organic phosphate) chemicals. Organic phosphate chemicals may enter the body directly through the skin as well as by inhalation and swallowing. As a rule, workers should wear protective clothing when applying these chemicals.

The national production of the halogenated hydrocarbon pesticides is many times that of the organic phosphate pesticides. Nearly half the production of halogenated hydrocarbon pesticides is DDT (143,216,000 pounds), a still effective but relatively less hazardous insecticide. In addition to DDT, this group of pesticides includes chlordane, lindane, aldrin, dieldrin, and toxaphene. Most pesticides in this group are less toxic than the organic phosphates. Some insecticides are used in homes and gardens as well as for crop protection. DDT, chlordane, lindane, and malathion are among these.

Other pesticides used for crop protection and also in homes and gardens may contain nicotine, fluorides, and arsenic compounds; all can be extremely hazardous.

Chemical and Clinical Type of Disease. Even though production of the halogenated hydrocarbon pesticides is much greater than that of the organic phosphate pesticides, on about 30% of the 910 reports, the offending chemicals were identified as organic phosphate pesticides and 8% as halogenated hydrocarbon pesticides. Herbicides were recorded on 8% of the total reports, fertilizers on 5%, and phenolic compounds on 4%. The type of chemical involved in the illness was not specified in nearly one-third of the reports.

Physicians entered dermatitis as the diagnosis on 53% of the reports, systemic poisoning on 36%, and respiratory conditions on 6%. Miscellaneous diagnoses were recorded on the remaining 5%.

The organic phosphate pesticides constitute 30% of all reports, but nearly 70% of the systemic poisoning reports, thus demonstrating their hazardous nature.

Parathion, Systox, or TEPP were cited in most of the systemic poisoning reports. Phosdrin, a relative newcomer, was implicated in 19 of the reports attributed to the organic phosphate pesticides.

Nine percent of the systemic poisoning reports were attributed to the halogenated hydrocarbon pesticides. Of 17 reports of disease attributed to methyl bromide, physicians indicated that 10 were systemic poisoning; of 5 reports of disease attributed to carbon tetrachloride, 4 were systemic poisonings. Fourteen reports of 37 attributed to DDT, chlordane, or lindane were recorded as systemic poisonings.

Where systemic poisoning is involved, the chemical agent usually is specified. In only 10% of the reports of systemic poisoning and 44% of other reports of illness was the chemical unspecified. From this, it can be inferred that the unspecified chemicals are for the most part the less hazardous materials. Further evidence of this is available from a 1957 follow-up study. Specific information was obtained for over half the reports in which the chemical was initially unspecified. Most of these chemicals were halogenated hydrocarbon pesticides or types usually classified to "other."

About 45% of the 480 reports of occupational dermatitis were not ascribed to specified chemicals; of these, 13% were ascribed to herbicides, 7% to the halogenated hydrocarbon pesticides, 6% to the phenolic compounds, and 5% to fertilizers. Only 4% were ascribed to organic phosphate pesticides.

Chemicals and Occupation. In 1958, there were 506 seasonally hired migrant workers per 1000 domestic farm workers in California. This proportion is considerably greater than that for the United States as a whole which was 218 migrant workers per 1000 domestic workers. Many of these farm laborers neither speak nor read English. There is some evidence to indicate that some such workers are at greater risk of serious illnesses attributed to pesticides and other agricultural chemicals than are other workers.

Farm laborers and foremen provided 486 reports of which 35% were attributed to organic phosphate pesticides, 7% to herbicides, and 5% each to halogenated hydrocarbon pesticides and fertilizers.

The operatives and kindred workers group (produce graders and teamsters) provided 120 reports of which 21% implicated organic phosphate pesticides, 12% halogenated hydrocarbon pesticides, and 8% herbicides, defoliants, and other weed killers.

Twenty-one of the 100 reports from laborers concerned organic phosphate pesticides, followed by halogenated hydrocarbon pesticides 9, herbicides 9, and the compounds 8.

Fatalities. Three fatalities were attributed to the occupational use of pesticides and other agricultural chemicals during 1958. A farm laborer felt ill at noon after dusting beans all morning with a mixture of parathion and sulphur. He could not return to work after lunch and was finally taken to the hospital by friends. He died that evening. At the autopsy, a diagnosis of parathion poisoning was made.

A tank truck driver was preparing a cotton defoliant by mixing diesel oil with pentachlorophenol. As he was drawing the concentrated pentachlorophenol out of a drum, the spigot accidentally toppled back into the drum. He reached in with his bare hand to regain the spigot, thus soaking his hand with concentrate. He washed immediately, but became acutely ill and died the next day. The third fatality concerned a laborer working in an ice storage room next to a date storage room which was being fumigated with methyl bromide. The gas leaked through into the ice storage room. The man died the following day of methyl bromide poisoning. (Reports of Occupational Disease Attributed to Pesticides and Agricultural Chemicals: State of California, Department of Public Health, 1958)

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Federal Hazardous Substances Labeling Act

According to the National Clearinghouse for Poison Control Centers, the Federal Hazardous Substances Labeling Act, the first to regulate the interstate distribution and sale of packages of a wide range of hazardous substances intended or suitable for household use, was signed by the President on 11 July 1960. This act is effective immediately, although enforcement of penalties will not occur for at least 6 months.

The law covers any substance that is toxic, corrosive, irritant, strongly sensitizing, flammable, or which generates pressure through heat, combustion, or other means, if it is capable of causing injury or illness to man. Substances covered by certain preexisting laws are excluded.

The law pertains specifically to labeling of hazardous substances. It requires manufacturers of such materials as may be defined under the act

as hazardous to label the immediate containers of these materials with the following information: Manufacturer's (or distributor's, et cetera) name and address; all ingredients (by common, chemical, or generic name) which contribute to the hazard; proper warning words in heavy type; affirmation of the the principal hazard, e.g. "flammable," "causes burns," et cetera; precautionary measures; handling and storage instructions; first aid instructions for injury or illness due to the product; the word "poison" for all "highly toxic" substances (defined explicitly in terms of ingestion, inhalation, and skin contact on the basis of tests in laboratory animals, with the provision that data from human experience takes precedence over the results of animal experiments in determining toxicity); and a warning to keep out of the reach of children. This information is to be printed prominently and clearly as defined. All products not so labeled are considered misbranded. The Secretary of Health, Education, and Welfare is given latitude to decide what substances will be considered hazardous and what labeling is required in any given instance.

Interstate traffic of misbranded substances is strictly prohibited by the act, and the Secretary of HEW is invested with full authority to investigate, examine, and inspect factories, warehouses, packages, et cetera, pursuant to enforcement of this act. He also is empowered to seize products that are labeled in violation of this law. Full penalties are delineated to be awarded by the Federal judiciary. The law will be administered under provisions of the Federal Food, Drug, and Cosmetic Act and will be administered by the Food and Drug Administration. (Federal Hazardous Substances Labeling Act: Occupational Health News letter, September 1960)

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Effect of Painting on Sound Transmission

Masonry partitions built of lightweight concrete block are widely used in many types of buildings, such as schools, offices, hospitals, dormitories, and motels. In most cases, an adequate degree of sound insulation between rooms is an important requirement. Experience with lightweight concrete block partitions has shown, in general, that when they are left unpainted or unplastered on both sides, their sound transmission properties are quite variable and may often be wholly unsatisfactory. This is on account of the porous structure of the block which allows sound to penetrate more or less freely. It is well known that plastering one or both sides of a partition having an abnormally low transmission loss will effect a considerable improvement, and similar results have been noted when a heavy paint coating is applied in such a manner as to seal the surface.

In the present investigation it was found that the sound transmission loss of any lightweight concrete block wall having its surface porosity

thoroughly sealed with paint does not depend on the pore structure, but is determined only by the weight and stiffness of the wall. The transmission loss of a painted porous wall is essentially equal to that of nonporous masonry of the same weight and stiffness. (H. J. Sabine, Effect of Painting on Sound Transmission Loss of Lightweight Concrete Block Partitions: Noise Control, 6: 62-66, March - April 1960)

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Toxicity of 1, 1-Dimethylhydrazine Vapor

Utilization of 1, 1-dimethylhydrazine in guided missile systems has promoted investigation of its potential health hazards. The authors found that the toxic effects seen in rodents from inhalation of 75 ppm and 140 ppm of 1, 1-dimethylhydrazine are tremors, convulsions, and death. Dogs were significantly more sensitive; the resulting toxic effects from exposure to 25 ppm were hemolytic anemia, convulsive seizures, and death. Repeated exposure of dogs to 5 ppm for 26 weeks produced only mild toxic effects (slight lethargy, some hemolytic anemia, slight bilirubinemia). Based upon the results of these experiments, there seems to be no doubt that for man the maximum allowable concentration (8 hours per day, 5 days per week for prolonged periods) of 1, 1-dimethylhydrazine vapor should be well below 5 ppm. Until more data and experience are available, it is suggested that 0.5 ppm be used as a guide to good industrial handling and safe practice. (E. E. Rinehart, et al, The Sub-Acute and Chronic Toxicity of 1, 1-Dimethylhydrazine Vapor: Industrial Hygiene Digest, August 1960)

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Plastics - Toxicology of Synthetic Resins

This presentation is the third revision of a paper originally written in 1954 (Industr Med Surg 23, 479). It represents a compilation of the literature concerning the toxicologic properties of synthetic resins. While not all inclusive, the bibliography can be used as a reference for the investigator of the toxicology of plastics. The second revision was presented in November 1955 (Industr Med Surg, 24:491). The authors discuss the subject under the following headings: acrylic resins, alkyd resins, amino (urea and melamine) resins, cellulose plastic materials, coumarone-indene resins, epoxies, fluorocarbons, nylon, phenolic resins, polyethylene, polyester resins, silicones, polystyrene, vinyl resins, and polyurethanes. There are 114 references to the subject in the bibliography. (R. H. Wilson, W. E. McCormick, Plastics - The Toxicology of Synthetic Resins: Industrial Hygiene Digest, August 1960)

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